

CLAIMS

1. A two-dimensional photonic crystal having a slab-shaped body in which modified refractive index areas, which have the same shape and whose refractive index
5 differs from that of the body, are cyclically arranged, which is characterized in that:

a plane shape of each modified refractive index area is a polygon whose corners are removed.

2. The two-dimensional photonic crystal according to claim 1, which is
10 characterized in that the modified refractive index area has a 3m-symmetrical shape.

3. The two-dimensional photonic crystal according to claim 2, which is characterized in that the polygon is an equilateral triangle.

15 4. The two-dimensional photonic crystal according to claim 1, which is characterized in that the corners are removed along an arc.

5. The two-dimensional photonic crystal according to claim 4, which is characterized in that:

20 the modified refractive index areas are arranged in a triangular lattice pattern;

the polygon is an equilateral triangle;

the refractive index of the body is within a range from 3.15 to 3.55; and

a radius r_a of the arc satisfies a following equation:

$$0 < r_a < [1.23(\text{FF}-0.34)^{0.5} - 1.28(\text{FF}-0.34) + 1.03(\text{FF}-0.34)^2],$$

25 where FF is an area fraction of the modified refractive index areas in the body.

6. The two-dimensional photonic crystal according to claim 1, which is characterized in that an area fraction FF of the modified refractive index areas in the body is within a range from 0.45 to 0.85.

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7. The two-dimensional photonic crystal according to claim 6, which is characterized in that the FF value is within a range from 0.5 to 0.70.

8. The two-dimensional photonic crystal according to claim 1, which is
10 characterized in that each modified refractive index area consists of holes.

9. An optical waveguide device, which is characterized in that it comprises:
a two-dimensional photonic crystal according to claim 1, in which a linear defect of
the modified refractive index areas is created.

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10. An optical resonator device, which is characterized in that it comprises:
a two-dimensional photonic crystal according to claim 1, in which a point-like defect
of the modified refractive index areas is created.

20 11. An optical multiplexer/demultiplexer, which is characterized in that it
comprises:

a two-dimensional photonic crystal according to claim 1;
at least one optical waveguide including a linear defect of the modified refractive
index areas created in the two-dimensional photonic crystal; and

25 at least one optical resonator including a point-like defect of the modified refractive

index areas created in a vicinity of the optical waveguide.